WHAT IS CLAIMED IS:

1. A peptide comprising a sequence of less than 50 amino acids characterised in that
   - it contains a peptide turn comprising at least one citrulline residue, and
   - it contains less than 12 amino acids between two cysteine residues, with said citrulline residue being one of the amino acids between said cysteine residues and
   - said peptide is specifically recognised by autoimmune antibodies from patients suffering from rheumatoid arthritis.

2. A peptide according to claim 1 characterised in that said peptide is a cyclic peptide.

3. A peptide according to claim 1-2 characterised in that said peptide is biotinylated.

4. A peptide according to claim 1-3 characterised in that said peptide is a synthetic peptide.

5. A peptide according to claim 1-4 characterised in that said peptide contains 4 or 6 residues between the cysteine residues.

6. A peptide according to claim 1-5 characterised in that said peptide has a sequence containing 14, 15, 16, 17 or 18 amino acids.

7. A peptide according to claim 1-6 characterised in that said peptide has one of the following primary amino acid structures:

8 AA – Cysteine – 2 AA – Citrulline – 3 AA – Cysteine – 2 AA, or

5 AA – Cysteine – 2 AA – Citrulline – 3 AA – Cysteine – 2 AA, or

4 AA – Cysteine – 2 AA – Citrulline – 3 AA – Cysteine – 2 AA, or

8 AA – Cysteine – 2 AA – Citrulline – 1 AA – Cysteine – 4 AA, or

6 AA – Cysteine – 2 AA – Citrulline – 1 AA – Cysteine – 4 AA, or

4 AA – Cysteine – 2 AA – Citrulline – 1 AA – Cysteine – 4 AA.

8. A peptide according to claim 1-7 characterised in that the amino acids flanking the citrulline residue have a small volume and that they do not interact with the citrulline side chain.

9. A peptide according to claim 1-8 comprising the amino acid sequence

QDTIHGHPCSXXGHRCGY, or
QDTIHGHPCSSXGHRCGY, or
QDTIHGHPCSXXGHQCGY or
QDTIHGHPCSXXGHRCGQ, or
QDTIHGHPCSXXGHQCGQ, or
QDTIHGHPCSXXGCRPGY, or
HGHPCSXXGHRCGY, or
HGHPCSXXGCRPGY, or
HGHGCDXXGHRCGQ, or
HGHGCDSXGHRCGQ, or
QDTIVGWGCDSXGCRPGQ, or
VGWGCDSXGCRPGQ.

10. An antibody raised upon immunisation with a peptide according to any of the claims 1-9, with said antibody being specifically reactive with said peptide and with said antibody being preferably a monoclonal antibody.

11. An anti-idiotype antibody raised upon immunisation with an antibody according to claim 10, with said anti-idiotype antibody being specifically reactive with the antibody of claim 10, thereby mimicking a peptide according to claim 1-9, and with said antibody being preferably a monoclonal antibody.

12 A diagnostic kit for use in detecting auto-immune diseases such as rheumatoid arthritis, said kit comprising at least one peptide according to any of the claims 1-9, or an

antibody according to any of the claims 10 or 11, with said peptide or antibody being possibly bound to a solid support.

13. A diagnostic kit according to claim 12, said kit comprising a range of peptides according to any of claims 1-9 or of antibodies according to any of claims 10 or 11, possibly in combination with antigens that constitute immunogenic determinants for other auto-immune diseases, wherein said peptides are attached to specific locations on a solid substrate.

14. A diagnostic kit according to claim 12 or 13, wherein said solid support is a membrane strip and said peptides are coupled to the membrane in the form of parallel lines.

15. A diagnostic kit according to claim 12 or 13 wherein certain peptides are not attached to a solid support but are provided in the binding solution to be used as competitors and/or to block other antibodies that are present in sera from patients with autoimmune disease other than rheumatoid arthritis, thereby decreasing or eliminating possible cross-reaction and/or a-specific binding.

16. Method for producing a peptide according to any of the claims 1-9, by classical chemical synthesis, wherein citrulline residues are substituted for arginine residues at certain steps during the chemical synthesis.

17. Method for producing a peptide according to claim 1-9, wherein the primary amino acid sequence is produced by classical chemical synthesis, and wherein at least one arginine residue subsequently is transformed towards a citrulline residue by contacting said peptide with a peptidylarginine deiminase.

18 An immunotoxin molecule comprising a cell recognition molecule being a peptide of any of the claims 1-9, or an antibody according to claims 10 or 11, covalently bound to a toxin molecule or active fragment thereof.

19. A peptide according to any of the claims 1-9 or an antibody according to any of the claims 10 or 11 or an immunotoxin molecule according to claim 18 or compositions thereof for use as a medicament.

20. Use of a peptide according to claims 1-9 or an antibody according to claim 10 or 11 or an immunotoxin molecule according to claim 18 or a composition thereof for the preparation of a medicament or of a diagnosticum for rheumatoid arthritis.

21. Use of a peptide according to claim 1-9 or a composition thereof for the preparation of a medicament to treat autoimmune diseases by increasing the size of antigen-immune complexes, thereby improving the clearance of the formed immune complexes.

22. Use of a peptide according to claim 1-9 or a composition thereof for the preparation of a medicament for oral or nasal administration to treat autoimmune diseases by inducing a state of systemic hyporesponsiveness or tolerance to said peptide or composition.